

**IDAHO DEPARTMENT OF FISH AND GAME  
2007 PANHANDLE REGION  
MARBLE CREEK BULL TROUT PASSAGE ASSESSMENT**

**ABSTRACT**

Upstream fish passage past four splash dams on Marble Creek, a tributary of St. Joe River, Idaho were assessed on July 23, 2007. Fish passage past these dams is critical to the re-colonization of bull trout in the upper reaches and tributaries of Marble Creek where we believe high quality bull trout habitat occurs. Based on this evaluation it was concluded that two of the four splash dams were likely fish passage barriers while the other two splash dams were not. Two natural drops or falls were also observed which we believe are barriers to migrating fish when stream flows were low. However, during higher flows when bull trout often migrate upstream, these natural drops likely are passable by adult bull trout. Based on this assessment we believe bull trout can access Homestead Creek which we believe provides high quality habitat. Access to Delaney Creek, Freezeout Creek and upper Marble Creek was still blocked by these splash dams in 2007. These streams are believed to have high-quality bull trout spawning and rearing habitat and may be critical to the success of the re-colonization of bull trout in the Marble Creek watershed. Possible alternatives for fish passage around these splash dams should be evaluated.

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## **INTRODUCTION**

According to the Federal Draft Bull Trout Recovery Plan, before bull trout recovery can be considered in the Coeur d'Alene Lake basin, the number and distribution of spawning bull trout populations must expand (USFWS 2002). The Draft Bull Trout Recovery Plan lists streams where it is believed that bull trout can re-colonize once current threats are removed. Marble Creek is one of the streams believed to have a high potential for bull trout recovery, but splash dams prevent bull trout from re-colonizing much of Marble Creek. The splash dams were constructed in 1915 and remained in operation until 1931 (USFS 2003). These dams were used to back up water so they would float a raft of logs. Water behind a dam would be released all at once so that the ensuing flush of water would transport the logs down to the next splash dam downstream. This procession would continue downstream until the logs would reach the St. Joe River. In 2003, it was concluded that fish passage above a splash dam 18 km upstream from the mouth of Marble Creek was possible due to its degradation from a flood in 1996 (DuPont et al. In Press). With the destruction of this dam, bull trout potentially had access to over 160 km of stream, some of which appeared to be high quality spawning and rearing habitat at elevations over 1,219 m (DuPont et al. In Press). Upstream from this dam there were still a series of splash dams that could potentially block access of bull trout to these quality spawning and rearing streams. The purpose of this survey was to evaluate these splash dams and determine if upstream fish passage was possible for adult bull trout which would allow them to reach high quality spawning and rearing habitat.

## **STUDY SITE**

Marble Creek flows into the St Joe River about 94 km upstream from its mouth. Marble Creek is about 41 km in length and throughout its watershed there were potentially 10 splash dams that could prevent bull trout from reaching spawning and rearing habitat (Figure 1). Four of these splash dams in particular had the ability to block bull trout from accessing an abundance of high quality spawning and rearing habitat. These four splash dams were located on the main stem of Marble Creek 25.6, 29.5, 30.3 and 40.8 km upstream from the mouth (Figure 1). Over 100 km of 2<sup>nd</sup> order or larger streams exist above these splash dams. Those tributaries over 1,219 m in elevation are believed to have the most potential in supporting rearing bull trout (Figure 1).

## **OBJECTIVES**

1. Evaluate whether four splash dams on the main stem of Marble Creek were barriers to upstream fish passage of adult bull trout.
2. Discuss alternatives to providing fish passage past any of the splash dams that were considered barriers.

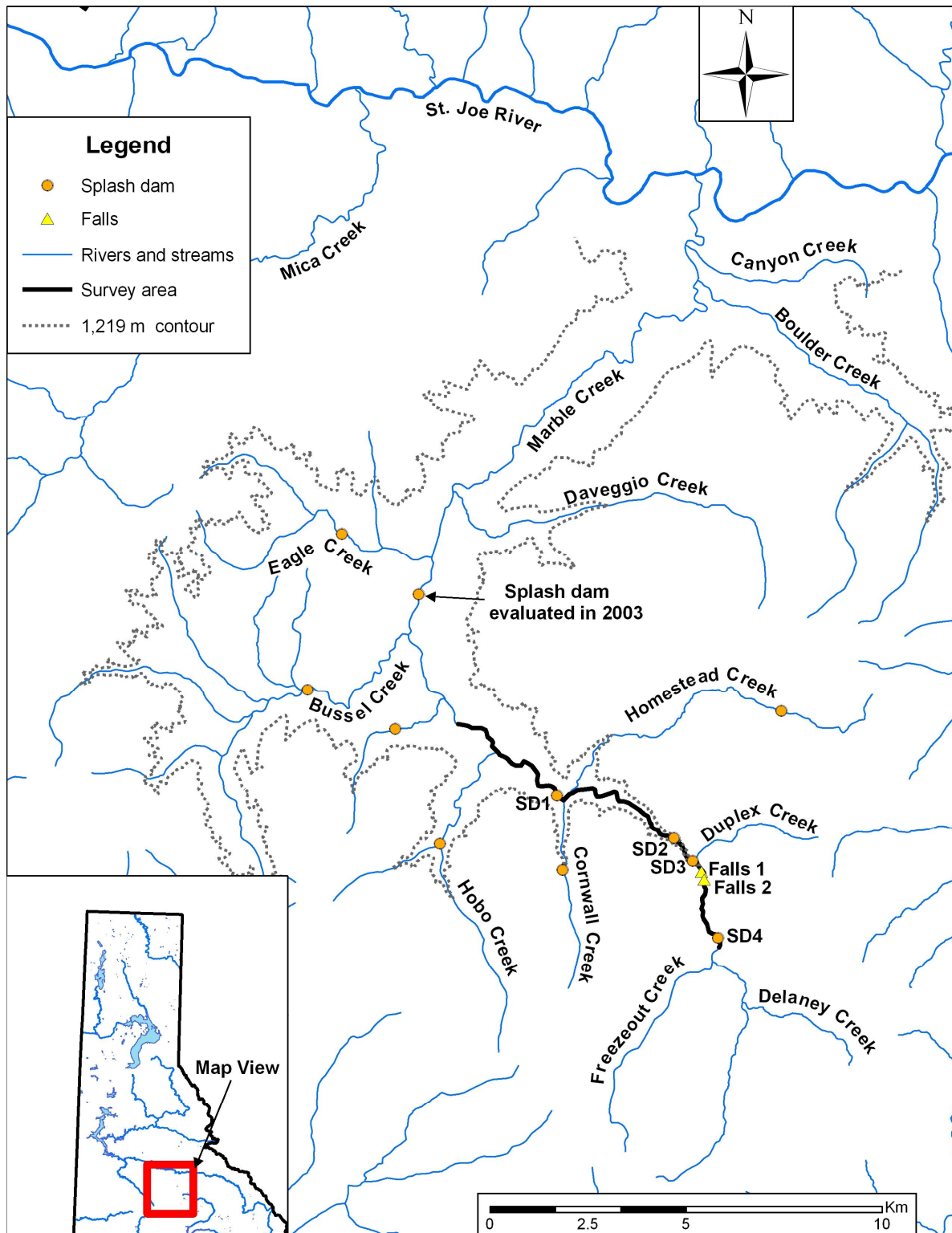


Figure 1. The location of the splash dams in the Marble Creek watershed, Idaho, that have the potential to block bull trout from accessing spawning and rearing habitat, including those splash dams (SD) and falls that were surveyed on July 23, 2007 to assess whether they were fish barriers.

## FINDINGS

We surveyed 10.9 km of Marble Creek on July 23, 2007 from the most upstream crossing of Forest Service road 321 to where trail 261 crossed Marble Creek (Figure 1). Four splash dams and two natural falls were documented in this reach of stream and assessed for fish passage (Table 1).

Table 1. The location of splash dams and falls in Marble Creek, Idaho, that were evaluated for fish passage on July 23, 2007.

Structure assessed	Coordinate (Datum: WGS 84)		Km upstream from mouth	Provide passage?
	Latitude	Longitude		
Splash Dam 1	47.10822	-116.06245	25.6	Yes
Splash Dam 2	47.09914	-116.02272	29.5	Probably not
Splash Dam 3	47.09404	-116.01625	30.3	No
Falls 1	47.09163	-116.01317	30.7	Possibly
Falls 2	47.08984	-116.01228	30.9	Possibly
Splash dam 4	47.07668	-116.00719	40.8	Yes

The first splash dam we encountered (Splash Dam 1) did not block fish passage. Over time, Marble Creek had totally eroded around the west side of this splash dam. The new channel did not flow through any part of the splash dam and no sudden drops in elevation occurred.

The second dam (Splash Dam 2) we encountered was over 3m high. Most of the flow cascaded over this dam along its east side (Appendix A). Holding pools did not appear to occur anywhere in this cascade that would allow a bull trout to navigate its way over this drop. Significant flows also occurred through the log structures on the east side of the dam. Although we were doubtful that adult bull trout could navigate through the logs or ascend the cascading falls, it was impossible to determine this with certainty. We were able to crawl into parts of the splash dam, but darkness and splashing water prevented accurate evaluation. This splash dam was constructed by logs ranging from 0.2-1.0 m in diameter which were anchored to each other with spikes and a criss-crossing log pattern. Rocks were placed inside the log structure to help hold it in place. It appeared the reason most of the flow occurred along the east side of the dam was due to natural degradation from past floods and weathering. Those logs that remained in place were relatively large (> 0.7 m in diameter) and appeared to be largely intact. However, these logs would be susceptible to the continual pounding of water and debris carried in the flow which could significantly reduce the life of this structure.

The third splash dam (Splash Dam 3) we encountered we believe was a total block to upstream fish passage (Appendix B). The majority of flows either occurred over a 3m vertical drop or passed through narrow slots in the logs. We believe the vertical fall is more than bull trout can jump and we did not observe any possible route through the dam. The dam structure was 3m high and spanned the wetted width of Marble Creek. Logs used to construct the splash dam ranged from 0.2-1.0 m in diameter. This dam was constructed similar to Splash Dam 2,

but it appeared to be very stable and entirely intact. After nearly 100 years of use, sediment had filled the channel to the top of the dam. This would allow large debris or substrate to pass over the dam during higher flows without causing much damage to the structure.

The 4<sup>th</sup> splash dam (Splash Dam 4) we encountered was nearly non-existent. The dam had nearly eroded away and provides no potential block to upstream fish passage

Two natural falls in Marble Creek were observed between splash dams 3 and 4. Flows were concentrated into a narrow (1.5 m) channel causing extreme velocities. Large boulders occurred in the plunge pools, restricting the depth and area of where upstream migrating fish would attempt to jump from. The first falls (Falls 1) was cascading, with a total drop of about 3 m. The second falls (Fall 2) was near vertical with an elevation drop of 2.5 m. Based on these characteristics we felt the drop and water velocities were too high and the jumping pool inadequate for bull trout to negotiate these falls during periods of low flows when we conducted our survey. However, based on the moss line in this canyon (see appendix C), during higher flows the drops over these falls would be significantly diminished, the jumping pool would become deeper and multiple routes would be possible for fish to attempt passage. Based on this reasoning, we believe that during periods of higher flows upstream passage for adult bull trout is likely.

## **DISCUSSION**

Based on our survey, we believe two splash dams in Marble Creek are still fish passage barriers and prevent bull trout from reaching streams we believe provide quality spawning and rearing habitat. These barriers will restrict movement of bull trout into several streams over 1,219 m in elevation, most notably are Delaney Creek, Freezeout Creek, Duplex Creek and upper Marble Creek all. Many streams above 1,219 m in elevation in the upper St. Joe River and Little North Fork Clearwater River have been found to have thriving bull trout populations (DuPont et al. In Press).

Bull trout movement into over 160 km of Marble Creek and its tributaries had been blocked by splash dams since their introduction in 1915 (USFS 2003). Bull trout were documented in Boulder Creek, Deveglio Creek, and Eagle Creek in the Marble Creek watershed in the early 1930s (IDFG 1933). All of these streams entered Marble Creek below a splash dam 18 km upstream from the mouth that we believe was a fish passage barrier until 1996. To the best of our knowledge, bull trout were not documented upstream of this splash dam prior to 1996. We do not have records of species present in the Marble Creek drainage prior to 1933, although we believe that bull trout occurred throughout the higher elevations in the Marble Creek watershed prior to the construction of the splash dams. In the flood of 1996, the splash dam 18 km upstream from the mouth of Marble Creek blew out and was identified as passable to adult bull trout (DuPont et al. In Press). This passage provided the potential for bull trout to migrate upstream to enter potential spawning and rearing streams. Upstream from this splash dam there were no potential barrier for at least 8 km - the location of Splash Dam 1. Several streams enter Marble Creek in this reach of stream, including Bussel Creek, Cranberry Creek and Hobo Creek. All of these streams have reaches that extend above 1,219 m in elevation; however, they all have splash dams on them prior to the 1,219 m elevation mark.

Fish passage at those sites are unknown. Nevertheless, a large portion of their habitat that had been inaccessible is now available for bull trout.

Homestead Creek flows into the east side of Marble Creek upstream of Splash Dam 1. Since Splash Dam 1 does not inhibit bull trout movement, nearly all of Homestead Creek, much of which occurs all above 1,219 m, is accessible. Near the headwaters of Homestead Creek another splash dam exists, although it is not known if this dam blocks upstream passage. Cornwall creek also occurs just upstream of Splash Dam 1. Cornwall Creek flows into the western side of Marble Creek, and based on its elevation, is another stream that could potentially provide spawning and rearing habitat for bull trout. Cornwall Creek also has a splash dam on its main reach near the 1,219 m elevation. Fish passage beyond this point is unknown.

The second dam we evaluated (Splash Dam 2) probably blocks upstream fish passage. Considerable flow occurs around and through the east side of the splash dam, but the 3 m drop is probably more that bull trout can handle. With fish passage above this second splash dam improbable, it blocks off 25 km of potential bull trout spawning and rearing habitat. Upstream from this site, all tributaries and the remaining reaches of Marble Creek are above 1,219 m in elevation. The largest tributary between Splash Dams 2 and 3 is Duplex Creek, which potentially provides bull trout spawning and rearing habitat. The stream gradient in Duplex Creek would probably limit bull trout use to the lower half, assuming no natural barriers occur. No known man made barriers occur in Duplex Creek to restrict bull trout movement. The logs that support Splash Dam 2 appeared stable, although where the majority of the flow occurs they must endure a continual pounding of water and debris. This process could significantly reduce the life of this structure and makes its susceptible to failure from future flood events.

Splash Dam 3 occurs about 2.3 km upstream of Duplex Creek. This splash dam completely blocks all upstream fish passage. We crawled around the splash dam evaluating its structure and it appeared in very good shape and entirely intact. Floods will likely have minimal impacts because sediment build up on the upstream side of the dam allows substrate and other debris to flow over the splash dam with minimal contact. Based on its stability and resistance to flood impacts, Splash Dam 3 could potentially pose as a fish barrier for the next 100 years. If fish passage is desired in the near future above this splash dam, alternative passage routes would have to be developed. Upstream of Splash Dam 3 is Freezeout Creek, Delaney Creek and the upper reaches of Marble Creek. These streams are above 1,219 m in elevation and contain what we believe to be the best bull trout spawning and rearing habitat in the Marble Creek watershed.

Splash Dam 4 poses no threat to fish passage. Degraded over time, the splash dam is nearly gone and provides no obstacle for migrating fish.

Because two of the splash dams we evaluated are believe to be fish barriers and could potentially block passage for another 100 years, effort should be made to correct them. However, preserving the historical significance of the splash dams is a big concern as numerous people appear to visit these sites based on the trails that lead to them. Any work done on or around these splash dams would require approval by the U.S. Forest Service, which would entail NEPA analysis and approval from the State Historic Preservation Office. One possible solution would be to blast away the failing east side of Splash Dam 2, and to create a channel around the west side of Splash Dam 3. This type of action would remove the fish passage problem, but would still preserve the majority of these splash dams and their historical significance.

We encountered two natural falls between Splash Dams 3 and 4 that could potentially pose a fish barriers to adult bull trout. The first fall was cascading with a total elevation drop of approximately 3 m (Appendix C). The second fall had a 2.5 m vertical drop. Both of these falls occurred in a narrow (1.5 m) bed rock canyon. During higher flows we believe the drops to these falls would be significantly reduced and several possible routes would be available. During these conditions, we believe adult bull trout (> 500 mm) would be able to pass these falls.

## **RECOMMENDATIONS**

1. Discuss with the Forest Service techniques that could be used to provide fish passage around splash dams 2 and 3 while maintaining their historical significance.
2. Assess whether the splash dams in Homestead Creek and Hobo Creek prevent bull trout from reaching quality spawning and rearing habitat.
3. Periodically assess the condition of the splash dams to determine if fish passage has changed.
4. Periodically assess the fishery in those tributaries of Marble Creek where we believe bull trout can successfully re-colonize. If these streams are not re-colonized by bull trout in 10 years, it may be wise to discuss the possibility of re-introducing bull trout into areas where we believe high quality habitat occurs.

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Appendix A.



Looking upstream at Splash Dam 2 in Marble Creek, Idaho, on July 27 2007..



Appendix B.



Looking upstream at Splash Dam 3 in Marble Creek, Idaho, on July 27 2007.



Appendix B (continued).



A top view of Splash Dam 3, looking upstream in Marble Creek, Idaho, on July 27 2007.



Appendix C.



View of Falls 1 in Marble Creek, Idaho on July 23, 2007.